Underlying Axioms

• Don't put astronauts in places where robots work better (dull, dirty, dangerous)

• Recognize that in the big picture the presence of both a human program and robotic program (and coordinated) is better than either program alone

• There should be test of value before undertaking the development of a capability or obtaining information intended to benefit the "other" program

Value of Human Capabilities to SSE

- Aggressive launch vehicle capability
- Reduced Cost of Access to Space
- Advanced In-Space Propulsion
- Response/Interactive Operations
- Autonomy Technologies
- In-Space Assembly
- Nuclear Launch and In-Space Approval/Application
- In-Space Sample Receiving (and reduced back-contamination reqmnts)
- On-site repairs
- Exploration and hazard mitigation of NEOs

Value of SSE to Human Exploration

- Definition of space radiation environment
- Resource surveys with mass fraction reduction objective
  - Structural Materials
  - Thermal Control Materials
  - Propellants
  - Life-Support Volatiles
- Automation/Intelligent System Technologies
- Material properties measurements
- Definition of extreme environments (temp, dust, pressure)
- Mobility demonstration
- TRL advancement to > Level 7
- Back-up Assets
- Prepositioned support assets
- Life-science Testing in deep space (zero-g, radiation, long time scales)